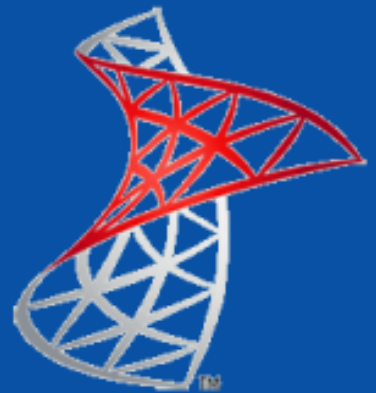


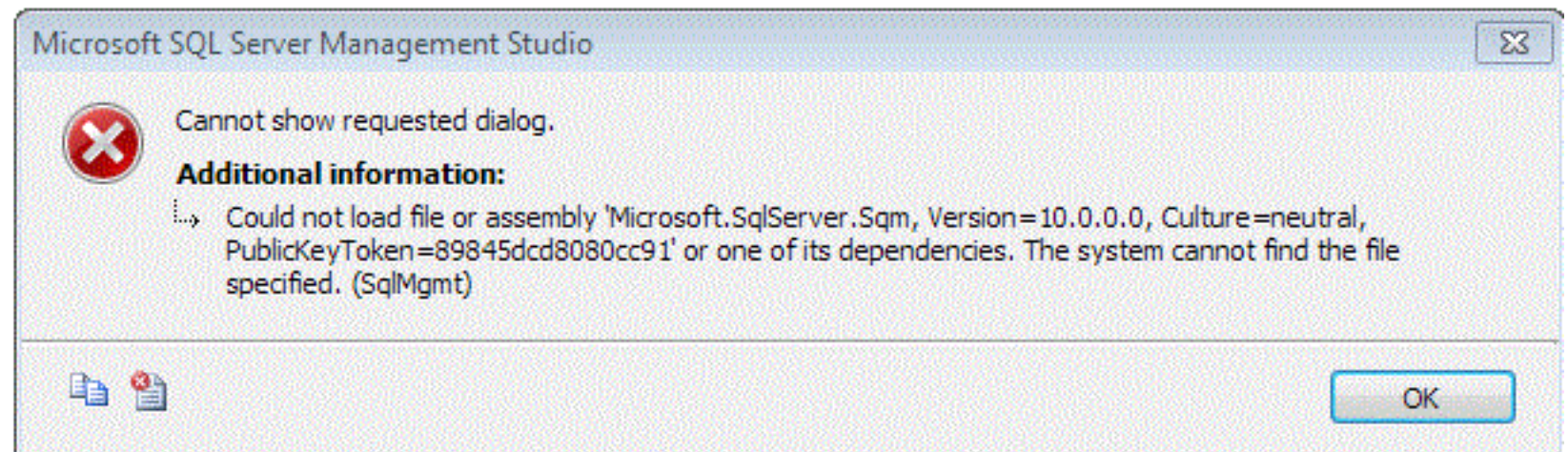
# Building a SQL Server Test Lab

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SQL Server MVP  
Data Architect



# What makes a full SQL Server Lab Useful

- An installation nightmare on one system
- Error prone shared features and files
- Multiple versions, builds, and editions
- Testing unique installations
- Testing Security, Network, Domain, Cross Environments



# Agenda

- Decisions on Virtual Technology
  - Hyper-V
  - VMWare
  - VHD
  - Cost Associations
- Speed Testing
- Storage
- Fundamental requirements of your lab
  - Network
  - Domain
  - Storage Server
  - Security
  - Licensing – We don't need no stinking...

# Decisions, decisions...

- How much money do you have
  - VMWare Workstation is around \$250
  - Client Hyper-V
    - Windows 8 Pro
    - Windows 7 – Upgrade to Windows 8 Pro or VMWare
  - Can your laptop/desktop handle this?
    - Memory is cheap so why do you have 4GB
    - Disk is cheap but can a laptop take more
    - Allocate around 25% to 30% to your virtual lab when it is running
  - Ease of installation and use
    - Windows 8 Pro? Hyper-V installation is a feature on tick away
    - Hyper-V is a bit more “configuration needy”
    - VMWare Workstation
      - VMWare out of the box runs with little to no configuration other than, create VM
  - Do you intend to share virtual machines?
  - Consultant, FTE, Geek in a garage

# Cost

- VMWare Workstation around \$250
- SQL Server Developer around \$50
- Windows Server 2012 Evaluation for 180 Days
- Possible Disk, Memory Upgrade Needs
  - You are ready to go...



All of these are feasible and much room for company expenses based on how you sell the need

A screenshot of the Microsoft website for downloading Windows Server 2012. The page features the Windows logo, the title 'Download Windows Server 2012', and a three-step process: 1. Review system requirements, 2. Register and download software for a 180-day trial, and 3. Receive guiding emails. There is a 'Select a version' dropdown menu and a prominent green 'GET STARTED NOW' button. At the bottom, there is a link to 'Get started' for a preview.

 **Download Windows Server 2012**

Windows Server 2012 is now available. It offers businesses and service providers a scalable, dynamic, and multitenant-aware cloud-optimized infrastructure. Windows Server 2012 helps organizations connect securely across premises and helps IT Professionals to respond to business needs faster and more efficiently. Need more information? See the [product details page](#).

- 1 Review [Windows Server 2012 system requirements](#)
- 2 Register, then download and install full-featured software for a 180-day trial
- 3 Receive emails with resources to guide you

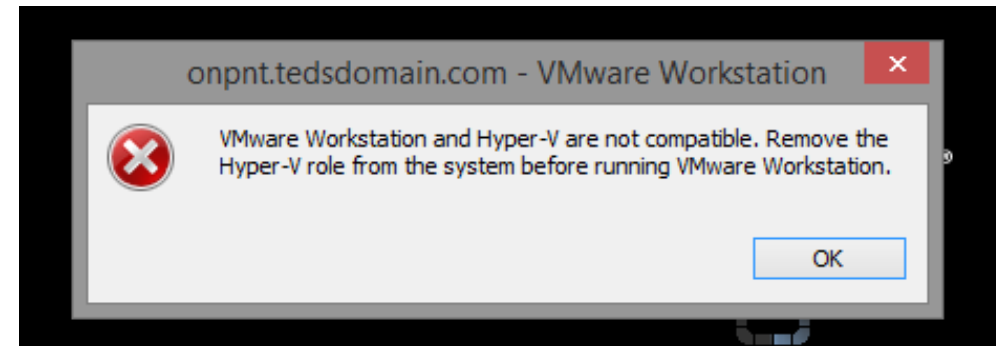
Select a version

**GET STARTED NOW**

Get the preview and see what you can do with Windows Server 2012 R2. [Get started](#)

# VMWare battles with Hyper-V Decisions

- What really is our need?
  - Setting up a SQL Server lab, not learning virtualization
  - Purchase, install, configure what will be efficient
- Both will suck the life out of your machine
- Both will require more disk
- Did I mention Windows Server is not free?
- Yes, SQL Server does not come with it either
- On Windows 8 Pro? No brainer, Hyper-V
- Can't have both
- Did someone say, Cloud?



# AWS and Azure Decisions

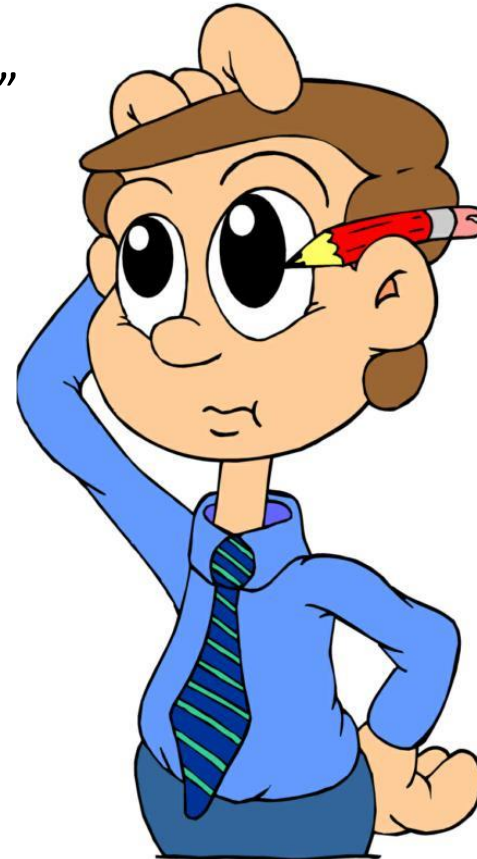
- Completely Capable Resources
  - Full Windows Server Installation Support
  - Full SQL Server Feature-set Support
  - Cost associated in bandwidth more than anything
  - Evaluation in Azure is greatly increased now
  - Performance variations do apply – Metal and Cloud are not the same
  - Disk Configurations
  - Core Count
  - Memory Usage
  - Shared Areas



# Speed, performance, I/O, Memory...

- Speed is a critical factor to calculate
  - Testing on a virtual lab <> Server infrastructure
  - Laptop <> DL580
  - Calculate a base formulation for a “Best Estimate”

$$\frac{4\text{MB}}{2048\text{ MB}} = \frac{X}{65536\text{ MB}}$$





# Who wants a mini-NAS?

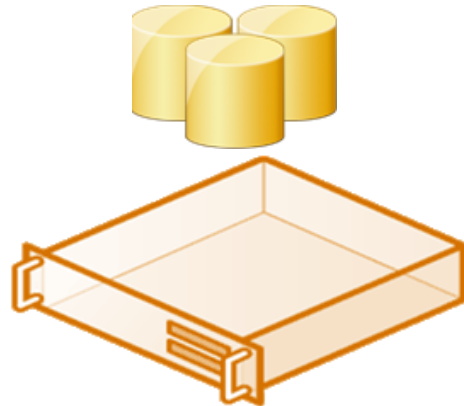
- Seriously, mini/portable SAN/NAS devices are useful
- External Drives
- Utilizing the ROM bay
  - Who really uses CD/DVDs any more?
- Laptop upgrade
  - Multiple bays
- SSD vs. SATA



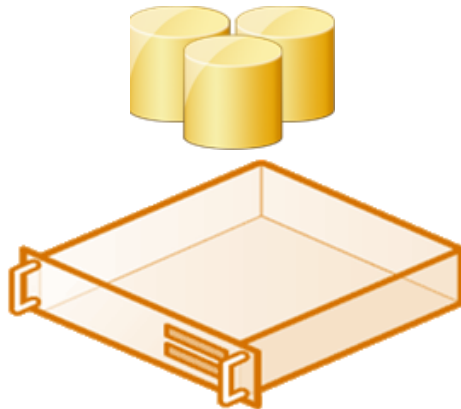
# Fundamental Needs

## Complete Solution

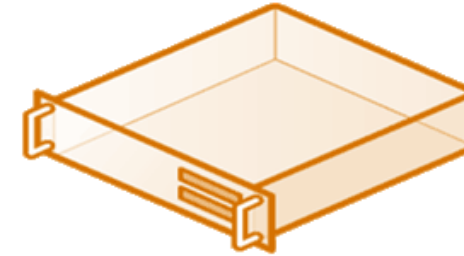
- Active Directory
- DNS
- Storage Services
- SQL Server
  - Features
  - Failover



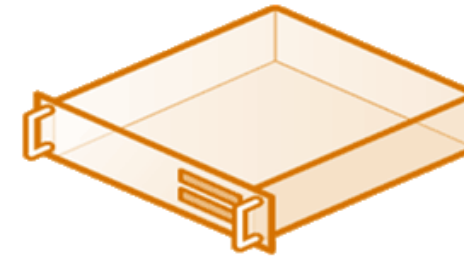
SQL Server 2012 Developer



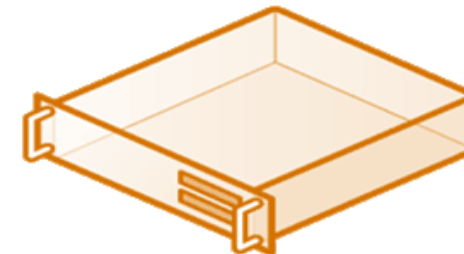
SQL Server 2012 Developer



Active Directory



DNS



Storage Server

# What's first?

- Things have to go in order
  - Domain Controller VM
    - DC – Configure Active Directory
    - DC – Configure DNS
    - DC – Configure Storage Services and Shares
  - Snapshot – Clone
  - Create Windows Server 2012 VM
    - Feature installations (.NET etc...), Patch, hotfix, Security, Configure
  - Snapshot – Clone
  - Copy Windows Server 2012 VM Clone x 2
  - Install SQL Server 2012, patch, configure
  - Snapshot – Clone
  - Install SQL Server 2012, patch, configure



# Network – VMWare/Hyper-V

- Hyper-V requires you to create a virtual switch
  - After that, you are good enough
- VMWare will allow out-of-the-box type configurations
  - So you're good from there
- Network configuration
- Complicated or Simplistic
  - Remember what the purpose is
  - Availability Group and multi-subnet testing
  - Internet access

Device	Summary
Memory	1 GB
Processors	1
Hard Disk (SCSI)	30 GB
Hard Disk 2 (SCSI)	5 GB
CD/DVD (IDE)	Auto detect
Floppy	Auto detect
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Device status

- Connected
- Connect at power on

Network connection

- Bridged: Connected directly to the physical network
  - Replicate physical network connection state
- NAT: Used to share the host's IP address
- Host-only: A private network shared with the host
- Custom: Specific virtual network

VMnet0

LAN segment:

LAN Segments... Advanced...

# Domain Controller to Rule Them All!

- We're not working at being an expert here
- Step one – install operating system...
  - OK, we're better than that
- Step one – Windows Server 2012 makes this easy
  - Install Active Directory Domain Services and Group Policy Management
  - Add Domain Controller
  - Add Forest
  - Checkbox, Checkbox, Checkbox...DNS ← you don't want to have to add this later
  - Don't forget passwords and don't write them under your laptop on a sticky note
  - Pick a meaningful NetBIOS name
    - ONPNT.TedsDomain.com

# Windows Server VM Build

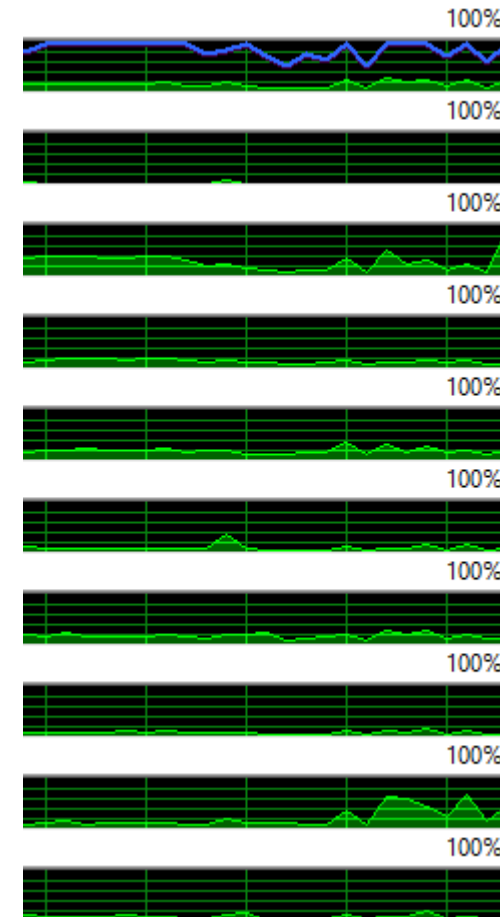
- Ensure you have your ISO ready
- Never bypass patching, SP level, Hotfixes
- Security – Do it right as easy as it is to do it wrong
- Decide between Server Core or GUI or Both
- I created my domain and a Windows Server but the Windows Server cannot see the domain...
  - Network. It's always the network
  - IP Configuration is your quickest configuration to a happy end result

# SQL Server / Windows Server Failover Cluster

- High Availability testing in your virtual lab
- Never bypass patching, SP level, Hotfixes
- Technology testing for SQL Server 2012/2014
- Feature-set exposure
- Capitalize on Windows Knowledge
- Capitalize on quick VM builds to SQL Server configuration

# Startup / Shutdown Order

- First rule, don't leave your VMs running all the time
- Second rule, don't leave your VMs running all the time
- Think about the order of shutdown
  - Node 4
  - Node 3
  - Secondary in failover
  - Primary in failover
  - Domain is always last – we haven't setup DC replication





# Negatives vs. Positives

- Cons
  - Remember, it is a hard life for your laptop/desktop
  - Cost associated with it
- Pros
  - You can test just about everything on your own
  - You have a much less chance of affecting your host
  - You can start from scratch in minutes
  - Supporting multiple versions, editions and on different OS versions, Editions

# You know you have a list of them

